

Quality Assurance Project Plan for the Special Multipurpose Applied Research Technology Station (SMARTS)

Section A: Project Management

Date: September 22, 1997

Project Title: Special Multipurpose Applied Research Technology Station (SMARTS)

Unit: Municipal Water Quality Investigations Program (MWQI), Water Quality Assessment Branch, Department of Water Resources.

Project Manager: Marvin Jung **QA Coordinator:** Murage Ngatia

2. Project/Task Organization and Responsibilities (organizational chart):

DWR Project Managers: Marvin Jung and Lori Weisser QA Coordinator: Murage Ngatia

3. Project Definition and Background:

Some of the options being considered by CALFED involve flooding portions of Delta islands that contain organic peat soils. There is concern that flooding will release dissolved organic carbon (DOC) from the peat soils covering many of the Delta islands, resulting in drainage water containing elevated concentrations of DOC and disinfection by-product (DBP) precursors. Release of these waters to the Delta channels could negatively impact the quality of water exported from the Delta for drinking water supply by increasing the potential to form trihalomethanes (THMs) and other DBPs during drinking water treatment. This threat is further exacerbated by the elevated concentrations of bromide found in waters in the Delta, which disproportionately contribute to elevated concentrations of THMS. There is not enough data to determine the best management option that would also maintain water quality.

SMARTS will consist of 9 fiberglass tanks assembled at Bryte Lab yard facility. Four of the tanks will measure 5 feet in diameter by 6 feet high (810 gallons). The other five tanks will be 5 feet in diameter by 11 feet high (1500 gallons). Varying levels of peat soil will be added to the tanks. A constant supply of city tap water will be provided to the tanks. Each tank will be covered with a thick layer of plastic to minimize algal growth. A control tank with no peat soil and filled with tap having no flow will be used as a control.

Objectives

SMARTS is a bench top experiment that will provide DWR researchers with more control and flexibility in modeling and characterizing how (1) rate of water flow, (2) amount of peat soil and (3) the depth of water affects the concentration of dissolved carbon in Delta soils. The

experiment will make it possible to simulate flooding of a Delta island and manipulate the factors associated with such flooding under controlled conditions. The study will Initially, test the three factors under high and low conditions. A medium treatment will be incorporated at a later stage. The bench-top study will be coordinated with an ongoing flooded island field study on Twitchell Island in the Delta.

4. Project/Task Description:

Assemblage of the station will be conducted by staff of DWR's Operations and Maintenance at Bryte Lab Yard. Marvin Jung and Lori Weisser will oversee the construction process. After assemblage of the station is completed, Marvin and Lori will complete the addition of the peat soils and water supply. Lori will be responsible for sampling and delivery of the samples to Bryte and contract laboratory. The data from this study will compliment data generated from a flooded island study at Twitchell Island.

Sampling Plan

Peat soils from a Twitchell Island field will be composited to serve as source of testing material. Samples will be tested for organic carbon, percent organic matter, total Kjeldahl organic nitrogen and total phosphorus following methods prescribed by Bryte Lab. Peat soils will then be added to the experimental tanks as shown in Table 1. Tap water will be used as water supply to keep the chemical composition consistent. For further information, see the sampling plan titled "Experiment #1: Study of the Effects of Water Flow, Water Depth, and Peat Soil Depth on DOC Levels in Surface Water from Flooded Delta Island Soils".

PARAMETER TABLE

Parameter	Number of Samples	Matrix	Sample Preservation	Holding Time
DOC	15	Water	H ₃ PO ₄ , pH<2, 4C	28 days
UVA	15	Water	Cool, 4C	48 hours
Reactivity-based THMFP+HAAFP	15	Water	0.45 um filtered, 4C	14 days after quenching
Total alkalinity	15	Water	HNO ₃ , pH <2	14 Days
Nitrite/Nitrate (as N)	15	Water		28 Days
Total Phosphorus	15	Water		28
Chlorophyll a	Variable			

PROJECT TIMELINE

Task No.	Task	Responsibility	Start Date	Completion Date
1	Assemble SMARTS	Staff of Operations and Maintenance	10/97	12/97
2	Start water sampling	Lori Weisser and Marvin Jung	1/98	4/98

3	Draft report and present to management	Lori Weisser and Marvin Jung , Murage Ngatia	4/98	5/98
4	Continuation of the project?	Will be evaluated at the end of year 1		

DWR staff will monitor the condition of the plumbing and fiberglass tanks for any signs of deterioration during the experiment.

5. Data Quality Requirements

MEASUREMENT QUALITY OBJECTIVES

Statistical analyses of analytical results will include analyses of variance and rank order analyses at 90% level of confidence.

Parameter	Detection Limit	Reporting Limit	Estimated Accuracy	Accuracy Protocol*	Estimated Precision	Precision Protocol**
DOC						
UVA						
Reactivity-based THMFP+HAA FP	MCAA- 0.04µg/L MBAA- 0.03µg/L DCAA- 0.05µg/L TCAA- 0.04µg/L BCAA- 0.05µg/L DBAA- 0.06µg/L	1Φg/L				
Nitrite/Nitrate (as N)		0.01 mg/L				
Total Phosphorus		0.01mg/L as P				
Chlorophyll <i>a</i>						

*Accuracy Protocol Formula - %Recovery

**Precision Protocol Formula - Relative Percent DifferenceData Representativeness

A representative sample of peat soil will be corrected from Twitchell Island for this study.

Data Comparability

Data from the DWR/USGS SoilTOC study and the current Flooded Island study will be compared to assess levels of DOC concentrations. A high level of confidence may be attained by comparing the two studies due to proximal geographic location.

DATA COMPLETENESS

Parameter	Number of Valid Sample Results	Number of Valid Samples Collected and Analyzed	Percent Complete

6. Special Training Requirements/Certification

Position Title

Requirements

Date of Training/Certification

N/A

7. Documentation and Records The reporting format will consist of data analyses and QC reports generated from the DWR FLIMS system. Data reports from DWR and USGS labs will include sample results and QC information. The following QC parameters will be included in DWR QC reports:

- a. holding times
- b. blanks
- c. surrogates
- d. sample matrix spikes
- e. sample LCS
- f. sample duplicates

Section B: Measurement/Data Acquisition

8. Sampling Process Design and Rationale

Site Location	Sample Matrix	Sampling Stations per Site	No. of Samples per Station	Sampling Method	Sample Type	Sample Parameters	Frequency of Sampling	QC Samples
Ag field	Water	11						
Flooded wetland	Water	18						

9. Sample Handling and Custody Procedures

10. Analytical Method Requirements

Sample Parameter	Matrix	Analytical Method Reference*

*Nonstandard methods need to be described and validation documentation cited

11. Quality Control Requirements

Field QC checks

Laboratory QC checks

12. Instrument and Equipment Testing, Inspection, and Maintenance Requirements

13. Instrument Calibration and Frequency

14. Inspection/Acceptance Requirements for Supplies and Consumables

15. Data Acquisition Requirements (Non-direct Measurements)

Data Management

Section C: Assessment and Oversight

17. Assessments and Response Actions

18. Reports to Management

Section D: Data Review, Validation, and Validation Requirements

19. Data Review, Validation, and Validation Requirements

20. Validation and Verification Methods

21. Reconciliation with User Requirements